FCTA

GB

INSTALLER MANUAL
VERSION E1

Fancom
AGRI-COMPUTERS

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CE

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WARNING: Independent alarm installation

Like all mechanical and electronic devices, the Fancom Control Unit may fail. Thus, when the Fancom Control Unit is controlling the environment for confined livestock, it is highly recommended by Fancom that an independent alarm system be installed. The Fancom Control Unit does provide a connection port designated for either make or break contact for the sounding of an alarm condition (please refer to installation guide for location). Failure to comply with the above warning may result in loss of product and/or profits, for which Fancom is not responsible or liable.

Always keep this manual by your computer

January, 1988

GB010101 **MODIFICATIONS RESERVED**
Art. Nr. A5911011

Table of contents

About this manual

This manual contains information about the installation and service of the computer. Read this manual carefully and follow all safety instructions. The installer's settings can then be entered and the computer prepared for further use.

This manual has been written by Fancom for the installer. A user's manual is also available, containing information about the computer's daily use.

If you have any questions regarding the computer, please do not hesitate to contact your Fancom dealer. The subjects discussed in this manual are listed in the table of contents.

The following symbols are used in this manual:

☞ Suggestions, advice and notes with additional information.

Caution
The product could be damaged, if the procedures are not followed carefully.

Caution
Life threatening situation, if the procedures are not followed carefully.

1. Introduction

The FCTA controller is used for climate control in the agricultural sector. It controls heating and ventilation in one section.

Communication
The computer can be linked in a serial communication loop (using a communication connector print). The computer can operated using a remote Personal Computer.

Caution

A computer is a piece of electronic apparatus. Any eventual technical malfunctioning can cause considerable damage. As a result of the increasingly strict demands laid down by insurance companies, it is necessary to connect the alarm contacts of the various computers to one central alarm unit. In addition, Fancom advises the installation of an extra, independent alarm system (e.g. a minimum/maximum thermostat).

2. Technical specifications

Power supply	
Mains voltage	230Vac (-10% +6%)
Mains frequency	50/60Hz
Power consumption electronics	max. 10VA
Fuse electronics	see connection diagram

4 Analog inputs, resolution 10 bits	
Max. temperature range sensor type S.7	-30°C to 110°C

1 RPM feedback input	
Max. frequency	200Hz

5 Relay outputs	
Relays 1-4, voltage free*	max. 2A 60Vdc/30Vac
Alarm relay, voltage free*	max. 2A 60Vdc/30Vac

Triac output (fan control)	
Max. load	6A
Min. load	0.5A
Fuse	see connection diagram

2 Analog outputs (10 bits)	
Voltage range	0-10Vdc
Maximum load	1mA
Output resistance	570Ω

Housing	
Plastic housing with screw on lid	IP54
Dimensions (l×w×h)	300×240×140mm
Weight (unpacked)	2.4kg

Ambient climate	
Operating temperature range	0°C to +40°C
Storage temperature range	-10°C to 50°C
Relative humidity	< 95%, uncondensed

Communication (optional)
Fancom serial loop for intercommunication of control computers and connection to PC *.

* For electrical connections and wiring data, see connection diagram

3. Safety instructions and warnings

3.1 General

Read the safety instructions carefully before mounting and installing the computer. The installation of the computer and trouble shooting must be carried out by an authorized technician/installer, according to the prevailing standards.

Fancom takes no responsibility for any possible damage as a result of incorrect settings and a non- or partially functioning installation.

3.2 Trouble


Never work on a computer with the power switched on.


Caution

1. Before a new fuse is placed, the cause of the defect should be remedied by an authorized installer.
2. Replace a defective fuse only by a fuse of the same type (see connection diagrams).

3.3 Installation

1. Take precautions against electrostatic discharge (ESD) when working on the computer.
2. Provide a clean and dry place to work


Disconnect power before installation.

3. Use correct wires as shown on the connection diagrams (appendix 3) and follow all instructions.
4. Make all wiring connections and check them before applying power.


Incorrect wiring may cause permanent damage.

☞ **Concerning the USA and Canada**
To simplify wiring the computer it is advisable to mount a 4" × 4" wireway below the computer. Two 1 ¼" wireways running between the computer and the wireway should be used, one for high voltage wire (rights side) and one for control voltage and sensors (left side). Seal all wireways after connection to prevent the entry of dust, aggressive gases and/or humidity. Use only shielded wire for sensors and control. Wires are to enter the computer and all Fancom computers from the bottom only!

3.4 Independent alarm system

A computer is a piece of electronic apparatus. Any eventual technical malfunctioning can cause considerable damage.


Caution
Fancom advises the installation of an extra, independent alarm system (e.g. a minimum/maximum thermostat). For the alarm connection diagram, see appendix).

4. Mounting and installation

Caution

It is essential that the alarm contacts of each computer are connected to a separate alarm system circuitry.

When mounting the computer, the following should be observed:

1. Never mount the computer near water pipes, drainage pipes etc.
2. Never mount the computer in a place where the weather has direct influence (not in the sun, not in places where the temperature can rise sharply, etc.).
3. Never mount the computer in a humid and/or dusty room and certainly not in the room where the animals are present.

No condensation may take place in or on the computer.

4. Use the holes behind the cover screws on the corners of the box to securely fasten the computer.
5. Mount the computer on a flat surface with the display at eye level. Make sure that the gland nuts are at the bottom of the computer.
6. Use gland nuts for the connection of the computer. Use the sealing plates to seal the gland nuts which are not used. Seal all gland nuts after connection to prevent the entry of dust, aggressive gases and/or humidity.
7. Make sure that the frequency and voltage of the network for which this computer is made are the same as the voltage and frequency present.
8. To protect against lightning, place an over voltage protection device in the power supply of the computer. Provide an ample ground wire.

9. Connect each computer to its own circuit breaker from the main electrical service panel.
10. It should be possible to disconnect the computer using a switch or plug.


Ensure the computer is well grounded.

11. Separate high/low current wires by mounting them in separate cable channels.
12. If metal cable channels are used, ground them.

Always observe the regulations of the electricity company

☞ **Advice**
Limit the length of the signal wires as much as possible; avoid crossing high/low voltage wires.

5. Controls

5.1 Ventilation control

Fancom has developed the FCTA for the control of ventilation systems. Triac or 0-10V controls can be used. If a 0-10V control is used, the following settings are important:

Correction factor Correction will take place if there is a difference between the measured and control value (or between the output value and control value, if there is no feedback). The extent of correction depends on the correction factor (factor between 0.0 and 1.0). The greater the correction factor, the quicker correction will take place; with a correction factor of 0.5 the computer will correct half the difference each control time. If the factor is 1.0, the computer will correct the difference in a single operation.

Control time The controller determines, at intervals equal to the set control time, whether correction of the 0-10V output is necessary.

Correction buffer Each control time the computer registers the difference between the measured and control value and adds these to the previous differences. As soon as the total sum exceeds the value of the correction buffer, an adjustment will be made.

The following are frequently used ventilation systems:

1. EXAVENT
2. Triac control with of without vortex damper
3. Central air exhaust
4. Analog control with or without vortex damper
5. Air inlet control
6. Second fan switching

A description of these systems follows.

EXAVENT
With EXAVENT control the Triac and vortex damper are controlled so that the calculated and measured ventilation are equal. Make the following settings:

Vortex damper : OUT.6 = type 7 (vortex damper EXAVENT)
Triac : OUT.14 = type 2 (ventilation with RPM feedback)

The inlet settings (SYS.9 thru SYS.16) do not apply to the vortex damper; the controller automatically calculates the vortex damper position. An air inlet can be controlled.

Triac control with or without vortex damper
If only a Triac is used, assign type 1 (without RPM feedback) or type 2 (with RPM feedback) at OUT.14.

If a vortex damper is used other than the damper belonging to the Fancom FMS unit, analog output 1 (OUT.6) or 2 (OUT.10) should be assigned as vortex damper control. If analog output 1 is used, settings OUT.7, OUT.8 and OUT.9 should also be made. If analog output 2 is used, settings OUT.11, OUT.12 and OUT.13 apply.

Enter the vortex damper settings at SYS.9 thru SYS.16. See the user's manual for a description of the vortex damper settings (section 3.2).

☞ If the vortex damper control is used, no air inlet controls can be assigned.

Central air exhaust
If the FCTA is used in a central air exhaust system, analog output 1 will be used to control a controllable inlet. When using a Fancom FMS unit, type 10 (ventilation with RPM feedback 10-0V) should be assigned at OUT.6.

Set that influence on the central air control is required at SYS.8 (see section 6.2).

Analog control with or without vortex damper
Fancom allows other types of power unit to be used. A frequency controller, for example, can also be controlled. In this case, the Triac control is not used.

Assign type 8 (ventilation 10-0V) to analog output 1 at OUT.6. If type 10 (ventilation with RPM feedback) is assigned here, the controller will correct the analog output, until the calculated and measured ventilation positions are equal. Correction factor (OUT.7), control time (OUT.8) and correction buffer (OUT.9) should also be set.

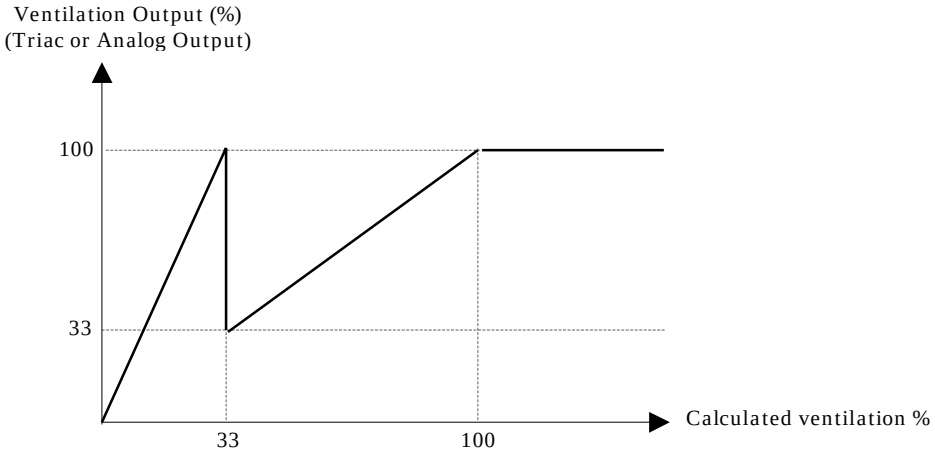
A vortex damper control can also be assigned. This is done at analog output 2 (OUT.10). Enter the vortex damper settings at SYS.9 thru SYS.16. See the user's manual for a description of the vortex damper settings (section 3.2). If there is an analog control with vortex damper, it is not possible to control another air inlet.

Air inlet control
The FCTA has two analog outputs. One output can be used to control an air inlet, for example, a curtain or inlet. This control is only available if the vortex damper control is not used (with the exception of the EXAVENT vortex damper).

If analog output 1 is used, settings OUT.7, OUT.8 and OUT.9 should also be made. If analog output 2 is used, settings OUT.11, OUT.12 and OUT.13 apply.

Enter the air inlet settings at SYS.9 thru SYS.16. See the user's manual for a description of the air inlet settings (section 3.2).

Second fan switching
It is possible to activate a second fan group (via a relay). At the moment of additional switching control of the main group will be reduced. From this point onwards both fan groups will be controlled back to 100%. The ventilation percentage of the main group in relation to the total controllable capacity can be entered at OUT.15. This is possible with both the Triac and the analog ventilation control.



Example: Capacity main fan 3000 m^3/h
Capacity 2 additional fans 6000 m^3/h (2 × 3000 m^3/h)
Fill in: 3000/(3000 + 6000) × 100% = 33%

Section 5.3.3 describes how one or two extra ventilation groups can be activated (not controllable).

5.2 Heating control

5.2.1 Relay

Heating on/off (1 relay)
This control becomes active as soon as the temperature is lower than *Required value - Hysteresis.* It will remain active until the measured value equals the required value.

A control time can be set to prevent hot-air heaters and gas heaters switching on and off unnecessarily. When the control is active the relay will be “on“ for the control time. When the control is deactivated it will remain “off ” for this amount of time.

Mixing valve control Open - 0 - Closed (2 relays)
The controller opens or closes the mixing valve until the measured value equals the required value. Settings *Hysteresis/Control range* and *Control time* are used to enter the extent and frequency of adjustment.

Example:	*Hysteresis/Control range*	10.0°C
	Control time	60 sec.

The control range is 10.0°C; i.e. 100 steps of 0.1°C.

With a difference of 0.1°C the controller will make a 0.6 second adjustment every 60 seconds.
With a difference of 5.0°C the controller will make a 30 second adjustment every 60 seconds.

5.2.2 Analog

The analog output controls the heating to aim for a minimum difference between the measured section temperature and the setpoint heating. If the measured temperature is too high, the heating will be switched off or stay at its minimum position. The following three settings determine the characteristics of this control:

	AnOut 1	**AnOut 2**
Correction factor	OUT.7	OUT.11
Control time	OUT.8	OUT.12
Minimum position	OUT.9	OUT.13

Correction factor

Correction will take place if there is a difference between the measured and control value (or between the output value and control value, if there is no feedback). The extent of correction depends on the correction factor (factor between 0.5 and 5.0). The greater the correction factor, the quicker correction will take place; with a correction factor of 1.0 the computer will correct the output by 10% per degree Celsius difference between measured and control value.

Control time

Control time is used to set the slow correction of the output value. As long as there is a difference between the measured and control value, the output will be corrected every 10 seconds, depending on the set time (short control time → quick correction, long control time → slow correction).
This correction should finally result in a minimum temperature difference between the measured and control value. Normally control time is set to a value between 200 and 900 seconds. If control time is set to a value less than 10 seconds, control is *proportional*.
If the control is equal to or more than 10 seconds, Fancom refers to the control as *integrated*.

Minimum position

In situations where the heating control should never be switched OFF, enter a minimum position (normally 0).

Example:	*Correction factor*	2.0
	Control time	600 sec.
	Minimum position	0

The computer will correct the output value by 20% per °C difference between measured and control value. With a permanent difference of 1.0°C, an extra correction of 20% to the output will take place within 600 seconds. The heating control should be able to turn OFF completely.

The *Control time* setting is used to determine whether the control is proportional or integrated.

Proportional

With proportional control the heating control stays on its minimum position, as long as the temperature is correct or too high. At too low temperatures, heating will increase the colder it is.

Integrated

An integrated control aims for a minimum difference between the control value and the measured temperature: too cold → more heating; too warm → less heating.

5.3 Thermal control

5.3.1 Second heating control

The FCTA has three possibilities to use an extra heating control:

1. As second heating control on the same sensor(s) (INS.6 = 0);
2. As second heating control on its own sensor in the zone (INS.6 = 4);
3. As second heating control on its own sensor, e.g. as floor heating, pre-heating in the central passage or creep heating (INS.6 = 2 or 3).

Second heating control is possible both via relay and analog control. See section 5.2.

☞ The factory settings and pre-settings 1 thru 5 (SYS.1) assume that the thermal control will be used as the analog heating control. The heating control itself works based on a relay.

5.3.2 Cooling control (relay)

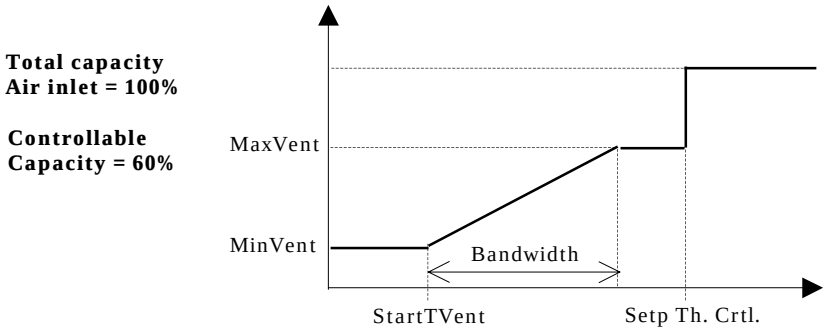
This control will become active as soon as the temperature rises above the *Required value* + *Hysteresis*. It will remain active until the measured value equals the required value. A *control time* can also be set here.

5.3.3 Extra fan control (relay)

A maximum of two ventilation groups can be switched on with a relay. If one ventilation group is to be activated set OUT.1 to 1 or 4. If two ventilation groups are to be activated set to 6.
If the air inlet is controlled, the air inlet can regulate over the entire range of the ventilation capacity. In this case the capacity of the controllable fans should be entered (in % of the total). This setting is made at OUT.16.

Example 1: There is one controllable fan with a capacity of 6000 m^3/h and a non-controllable fan with a capacity of 4000 m^3/h. The percentage of controllable ventilation is 6000 / (6000 + 4000) = 60%. Enter the value 60 at OUT.16.

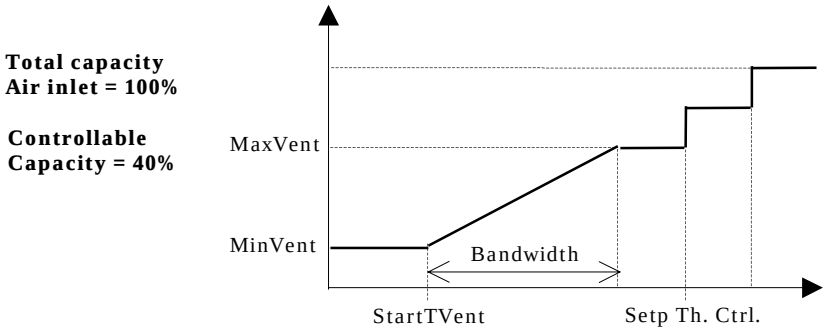
The extra fan is activated based on the setpoint thermal control.



Enter the air inlet position, as it should be at 60% total ventilation (controllable maximum ventilation) at SYS.11.

Example 2: There is a controllable fan with a capacity of 4000 m³/h and two non-controllable fans each with a capacity of 3000 m³/h. The percentage of controllable ventilation is 4000 / (4000 + 3000 + 3000) = 40%. Enter the value 40 at OUT.16.

The first extra fan activates based on the calculated setpoint thermal control. The second according to:
calc. Setp.Th.Ctrl. + (calc. Setp.Th.Ctrl. – Calc.startTVent - Calc. Bandwith)



Enter the air inlet position, as it should be at 40% total ventilation (controllable maximum ventilation) at SYS.12.

These extra fans are activated as soon as the temperature rises above the *Required value thermal control* + *Hysteresis.* The control will remain active until the measured value equals the required value. A *Control time* can also be set here.

6. Installer settings

6.1 Accessing and quitting installer settings

There are three different types of installer settings:

1. SYS settings
2. INS settings
3. OUT settings

Before these settings are made, Fancom will explain how to access the different groups of settings.

Method: accessing SYS/INS/OUT settings

1. Press  and  simultaneously (± 2 seconds), until NOR appears on the display.
2. Press  until SYS, INS or OUT appears on the display.
3. Press  . The first setting of the selected group is displayed.

☞ The name of the selected group of installer settings (SYS, INS or OUT) will briefly appear on the display every five seconds.

Method: quitting SYS/INS/OUT settings

1. Press  and  simultaneously until SYS, INS or OUT appears on the display.
2. Press  , until NOR appears on the display.
3. Press  . The computer has returned to normal mode.

☞ If the computer is not used for five minutes, it will automatically return to the first option from the NOR menu.

6.2 SYS settings

As soon as the SYS settings have been accessed, the computer operates in so-called “SYS-mode “. The menu options are now different.

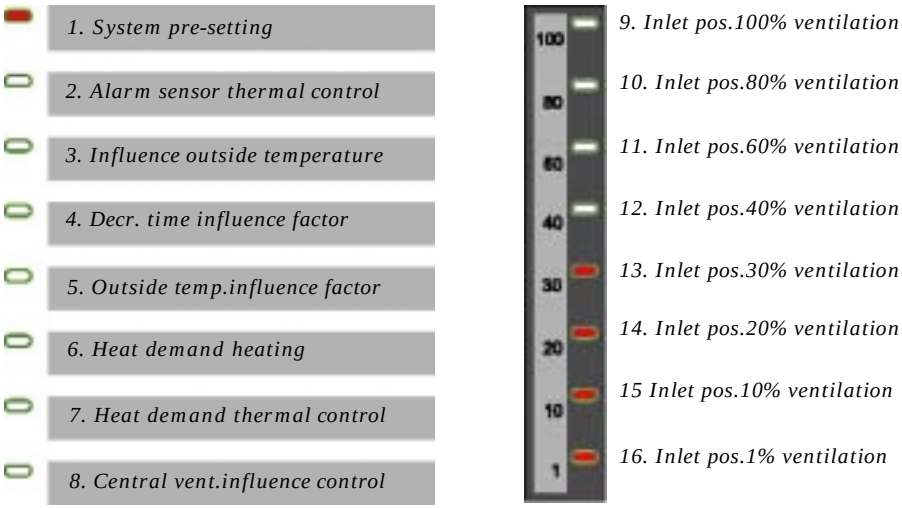


Fig. 1: Overview SYS settings

SYS.1 System pre-setting
(Range = 0, 1, 2, 3, 4, 5, 6, 7)
(Factory setting = 0)

Table 1 shows an overview of the possible pre-settings. See appendix 3 for correct connection diagrams.

Table 1: Overview system pre-settings

Nr.	Ventilation	Heating	Therm. ctrl.	Vortex damper/ Air inlet	Second fan
0	triac without DSR feedb.	on/off	on/off analog 0-10V/10-0V	analog 10-0V	on/off
1	triac with DSR feedb.	on/off	on/off analog 0-10V/10-0V	vortex damper analog 10-0V	on/off
2	triac with DSR feedb.	on/off	on/off analog 0-10V/10-0V	EXAVENT vortex damper analog 10-0V	-
3	triac with DSR feedb.	on/off	mixing valve analog 0-10V/10-0V	vortex damper analog 10-0V	-
4	triac with DSR feedb.	on/off	on/off analog 0-10V/10-0V	air inlet analog 10-0V	on/off
5	triac without DSR feedb.	on/off	cooling off/on 0-10V/10-0V	vortex damper analog 10-0V	on/off
6 °F 60Hz	triac without DSR feedb.	on/off analog 0-10V	2x off/on 2-step cooling	air inlet analog 10-0V	on/off
7 °C 50Hz	triac with DSR feedb.	on/off analog 0-10V/10-0V	on/off	EXAVENT vortex damper anal. 10-0V	-

SYS.2 Alarm sensor thermal control
(Range = 0, 1)
(Factory setting = 0)

☞ Only important if INS.6 = 2, 3 or 4.

Enter whether the alarm limits entered at menu options *Abs. Max.*, *Max.* and *Abs. Min.* concern thermal control measurement.

Setting	Alarm sensor thermal control
0	No alarm on thermal control sensor.
1	The set alarm limits also apply to the thermal control (taking a high outside temperature into account).

SYS.3 Outside temperature influence
(Range = 0, 1, 2, 3, 4, 5)
(Factory setting = 0)

Setting	Influence
0	No influence.
1	Low outside temperature influence on bandwidth.
2	High outside temperature influence on bandwidth.
3	Low and high outside temperature influence on bandwidth.
4	High outside temperature influence on start temperature ventilation and heating.
5	Low outside temperature influence on bandwidth and high outside temperature influence on start temperature ventilation and heating.

Low outside temperature
During cold days (low outside temperature) the bandwidth can be influenced; ventilation is not increased as quickly when the temperature rises above *Start temperature ventilation*.

When the outside temperature is 5°C lower than S*tart temperature ventilation*, the controller will increase the bandwidth by 0.1°C for each degree that it is colder.

High outside temperature
During warm days the high outside temperature can influence the bandwidth or start temperature ventilation. The temperature control between the day and night period is more gradual.

☞ If a high outside temperature influence on bandwidth has been chosen and the same sensors are used for ventilation and thermal control, *Setpoint thermal control* will also be influenced by a high outside temperature. This only applies if the thermal control is assigned as cooling or extra fan control.

☞ If a high outside temperature influence on start temperature ventilation has been chosen, *Setpoint heating* will also be influenced. If thermal control and ventilation control have been assigned to the same sensors, *Setpoint thermal control* will also be influenced by the high outside temperature.

If the outside temperature rises above *Start temperature ventilation* and ventilation is maximum, the controller will increase the bandwidth by 0.1°C every 5 minutes.

If the outside temperature drops below the set *Start temperature ventilation*, the controller will decrease the extra bandwidth or increase of start temperature ventilation again.

SYS.4 Decrease time outside temperature influence
(Range = 0 ... 48 hrs)
(Factory setting = 10 hrs)

Enter the length of time (hours), within which the controller must decrease the influence resulting from a high outside temperature.

If the outside temperature influence on start temperature ventilation and the setpoint heating have been set, the decrease time must be set to a period longer than 24 hours. During the first period of 24 hours, the decrease time will not be active; another extremely warm day could follow. However, if there are no more warm days, the computer will decrease for the number of hours exceeding the period of 24. For example, if the decrease time has been set to 32, the required room temperature will be back to normal again after 32-24 = 8 hours.

SYS.5 Outside temperature influence factor
(Range = 0.0 ... 9.9)
(Factory setting = 2.0)

Enter the extent of outside temperature influence.

Example 1: Outside temperature influence on bandwidth.

Outside temperature factor	2.5
Set bandwidth	4.0°C

The controller can increase the bandwidth by a maximum of 2.5 times. The maximum bandwidth is 10.0°C.

Example 2: Outside temperature influence on start. temp. ventilation
Outside temperature factor 2.5
Set bandwidth 4.0°C

The controller calculates a maximum shift of *Start temperature ventilation* + *Heating* or 2.5 × 4.0 - 4.0 = 6.0°C.

SYS.6 Heat demand heating
(Range = 0, 1, 2, 3, 4, 5, 6, 7)
(Factory setting = 0)

Enter whether heating influences the central pre-control. The FCTA cannot control a boiler itself, but transmits the heat demand via loop communication to a controller that can.

With types 1, 2 and 3 the FCTA determines heat demand using the following method:

Too cold House temperature is more than 1.2°C too low.
Normal House temperature is correct.
Too warm House temperature is more than 0.6°C too high.

With types 5 thru 7 (the + types) the FCTA determines heat demand as the difference between the measured temperature and the control value. The FCTA transmits the actual difference value (e.g. -0.8) to the controller responsible for the heating pre-control. The “coldest” section in the loop ultimately determines the heat demand.

Setting	Heat demand
0	No influence
1	Heat demand influences central pre-control 1
2	Heat demand influences central pre-control 2
3	Heat demand influences central pre-control 1 and 2
4	No influence (+)
5	Heat demand influences central pre-control 1 (+)
6	Heat demand influences central pre-control 2 (+)
7	Heat demand influences central pre-control 1 and 2 (+)

SYS.7 Heat demand thermal control
(Range = 0, 1, 2, 3, 4, 5, 6, 7)
(Factory setting = 0)

Enter whether the thermal control influences the central pre-control. The FCTA cannot control a boiler itself, but transmits the heat demand via loop communication to a controller that can.

The FCTA determines heat demand using the following method for types 1, 2 and 3:

Too cold House temperature is more than 1.2°C too low.
Normal House temperature is correct.
Too warm House temperature is more than 0.6°C too high.

With types 5 thru 7 (the + types) the FCTA determines heat demand as the difference between the measured temperature and the control value. The FCTA transmits the actual difference value (e.g. -0.8) to the controller responsible for the pre-control heating. The “coldest” section in the loop ultimately determines the heat demand.

Setting	Heat demand
0	No influence
1	Heat demand has influence on central pre-control 1
2	Heat demand has influence on central pre-control 2
3	Heat demand has influence on central pre-control 1 and 2
4	No influence (+)
5	Heat demand has influence on central pre-control 1 (+)
6	Heat demand has influence on central pre-control 2 (+)
7	Heat demand has influence on central pre-control 1 and 2 (+)

SYS.8 Central ventilation control influence
(Range = 0, 1, 2)
(Factory setting = 0)

The FCTA itself cannot control a central ventilation control. It can transmit its own calculated ventilation position to a controller that regulates a central air control.

Setting	Central ventilation control influence
0	No influence
1	The FCTA transmits the control value of the total ventilation to a controller that regulates the central ventilation based on the average (calculated) ventilation of all the assigned sections. This control is very suitable for a central air inlet.
2	The FCTA transmits the control value of the total ventilation to a controller that regulates the central ventilation based on the highest demand (calculated ventilation) and the greatest deficit (measured ventilation minus calculated ventilation) of the assigned controllers/sections. This method is very suitable for central air exhaust systems. This control should be set equally for the central air control and all the assigned controllers/ sections.

☞ If a second fan group is used which reduces control on the main fan group, central ventilation control will work based on the total controllable capacity.

SYS.9 Inlet position at 100% ventilation
(Range = 0 ... 100%)
(Factory setting = 100%)

Enter the inlet position that corresponds to 100% ventilation. See section 3.2 of the user's manual for a description of the air inlet control.

SYS.10 thru SYS.16 Inlet positions at 80%,60%,40%,30%,20%,10% and 1% ventilation (Range = 0 ... 100%) (Factory setting = 80% resp. 60%, 40%, 30%, 20%, 10%, 1%)

Enter successively the inlet positions corresponding to 80%, 60%, 40%, 30%, 20%, 10% and 1% ventilation. See section 3.2 of the user's manual for a description of the air inlet control.

6.3 INS settings

As soon as the INS settings have been accessed, the computer operates in so-called "INS-mode ". The menu options are now different.

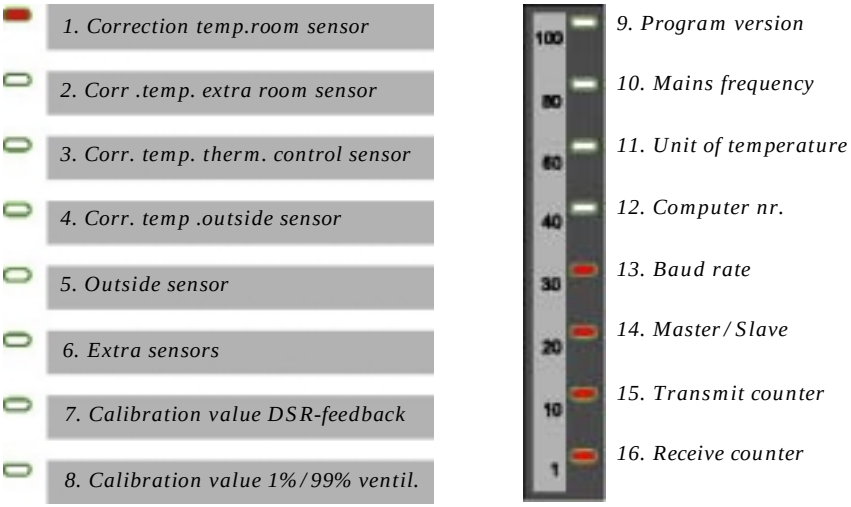


Fig. 2: Overview INS settings

INS.1 Correction room temperature sensor
INS.2 Correction extra room temperature sensor
INS.3 Correction thermal control temperature sensor
INS.4 Correction outside temperature sensor
(Range = -9.9 ... 9.9°C)
(Factory setting = 0.0°C)

Any difference in the measured temperature in relation to the actual temperature can be set here.

1. Select INS.1, INS.2, INS.3 or INS.4.
   The temperature to be corrected will appear briefly, followed by the current correction.
2. Press  .
3. Change the temperature into the required value.
4. Press  . The required temperature (for one second) and the new calculated correction will appear successively.

☞ If a correction is to be entered for a temperature sensor, ensure this sensor has been connected.

INS.5 Outside sensor
(Range = YES, NO)
(Factory setting = NO)

Setting	Outside sensor
NO	The FCTA receives the outside temperature via loop communication from another controller (if present).
YES	The FCTA measures the outside temperature using the sensor connected to analog input 4. It can transmit the measured outside temperature via loop communication to the other controllers.

INS.6 Extra sensors
(Range = 0, 1, 2, 3, 4)
(Factory setting = 0)

Setting	Extra sensors
0	No extra sensors.
1	Extra room sensor on analog input 2.
2	Thermal control sensor on analog input 3.
3	Extra room sensor on analog input 2 and thermal control sensor on analog input 3.
4	Extra room sensor for zone control on analog input 2. Heating is controlled based on sensor 1, thermal control based on sensor 2. Ventilation control based on the average value of both sensors.

INS.7 Calibration value Direction Sensitive Rotation feedback (DSR f.back)
(Range = 0 ... 999)
(Factory setting = 110)

Start calibration
(Range = 0, 1)
(Factory setting = 0)

☞ Make sure that the DSR feedback has been assigned OUT.6 = 10, 11 or 12 or OUT.14 = 2.

Method

1. Press  . The current calibration value will flash on the display.
2. This calibration value can be changed, but normally  is used to go to the second field.
3. Start calibration by entering the value 1. The fan will run at full speed.
4. After a minute (maximum) the value 0 or 2 will appear on the display: 0 = calibration successful; 2 = calibration unsuccessful.

Calibration unsuccessful
The most likely cause is that the computer has measured too few pulses. The DSR feedback is possibly too unstable, making correct measurement impossible.

Try to localise the fault and repeat the calibration procedure. If this is still unsuccessful, switch to control without DSR feedback. Ensure any vortex dampers or air inlets are completely opened before starting the procedure. If the controller controls the inlet position, the air inlets will open during calibration.

INS.8 Calibration value 1% and 99% ventilation
(Range = 0 ... 200)
(Factory setting = 60 resp. 125)

If the Triac control is used for ventilation control, set the control range of the triac here. The 1% setting will appear on the display, followed by the 99% setting.

☞ Fancom always advises carrying out 1% and 99% calibration, in connection with control without DSR feedback or automatic switch over from control with DSR feedback to control without DSR feedback (if DSR feedback fails).

Method: Calibration 1% ventilation

1. Press  .
2. Use  or  to increase or decrease the value. The fan will then run at a higher or lower speed.
3. Set the value so that the fan is barely running. The voltage on the fan terminal clamps, between U and V, can also be measured. Set this voltage to the minimum value that is accepted by the fan, assuming that the user has no DSR feedback – or that the DSR feedback is not functioning.
4. Press  to confirm the 1% setting. The display will keep flashing.

Method: Calibration 99% ventilation

5. Use ▲ or ▼ to increase or decrease the value. The fan will then run at a higher or lower speed.
6. Set the value so that the fan is barely running at top speed. The voltage on the fan terminal clamps, between U and V, can also be measured. Set this voltage to 95% of the power supply.
7. Press ● to confirm the 99% setting.

☞ The computer also controls analog outputs 1 and 2 during control or adjustment of the vortex damper or air inlet. During the 1% (99%) adjustment the output on the analog outputs is 1% (99%).

INS.9 Program version

The program version of this computer (for example: E1.0).

INS.10 Mains frequency
(Range = 50Hz and 60Hz)
(Factory setting = 50Hz)

Enter the correct mains frequency.

☞ Turn the computer off, and on again after changing the mains frequency.

INS.11 Unit of temperature
(Range = °C and °F)
(Factory setting = °C)

Enter the unit of temperature.

INS.12 Computer number
(Factory setting = 1)

If the computer is connected in a serial communication loop, each computer should have its own, unique number.

☞ Fancom advises entering one computer number to avoid peak load on the power supply if several controllers are switched on simultaneously.

The settings below (INS.13 thru INS.16) are only important if the FCTA has been connected in a communication loop.

INS.13 Baud rate communication
(Factory setting = 24-b)

All computers in a loop should have the same baud rate setting. The loop communication normally works at 2400Bd, but if using a modem of 1200Bd, for example, all the connected computers should also be set to 1200Bd.

12-b = 1200Bd - with interference sensitive communication
24-b = 2400Bd - normal
48-b = 4800Bd - under very good conditions

INS.14 Communication level: Master/Slave
(Factory setting = 1)

Enter whether the computer functions as Master (settings = 0) or Slave (setting = 1). The Master is the computer which controls the communication. All the other computers should be set as Slave.

INS.15 Transmit counter
INS.16 Receive counter

Communication counters with loop communication for receive (Receive) and transmit (Transmit). These counters can be used to trace faulty communication connections. In this case set all the counters on all the computers to “0”. Normally these counters increase simultaneously. Communication has failed between the last computer where the counters are increasing simultaneously and the first computer where the counters are not increasing at the same speed.

Readout the number of messages sent at INS.15 and the number of messages received at INS.16 (no PC messages).

6.4 OUT settings

As soon as the OUT settings have been accessed, the computer operates in so-called “OUT-mode “. The menu options are now different.

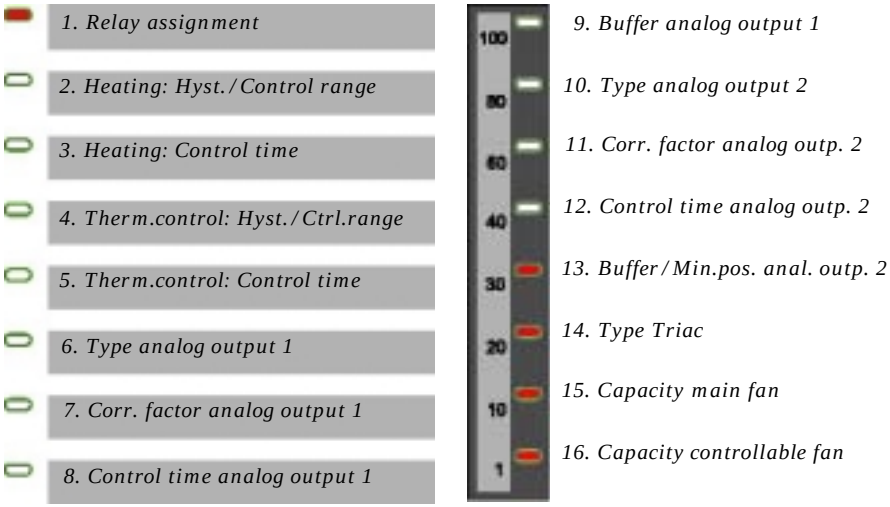


Fig. 3: Overview OUT settings

OUT.1 Relay assignment
(Range = 0, 1, 2, 3, 4, 5, 6, 7)
(Factory setting = 0)

Table 2: Overview of possible relay assignments

Nr.	Heating	Thermal control	Second fan group
0	on/off relay 3	on/off (heating) relay 1	yes relay 2
1	on/off relay 3	off/on (cooling/extra vent.*) relay 1	yes relay 2
2	on/off relay 3	mixing valve relays 1+2	no -
3	mixing valve relays 3+4	on/off (heating) relay 1	yes relay 2
4	mixing valve relays 3+4	off/on (cooling/extra vent.*) relay 1	yes relay 2
5	mixing valve relays 3+4	mixing valve relays 1+2*	no -
6	on/off relay 3	2x off/on (cooling/extra vent.*) relays 1+2	yes relay 4
7	on/off relay 3	mixing valve relays 1+2	yes relay 4

* See section 5.3.3

OUT.2 Hysteresis/Control range heating
(Range = 0.0 ... 99.9°C)
(Factory setting = 0.3°C)

On/Off control Enter the *Hysteresis (°C)*, (section 5.2.1, *Heating on/off*).

Mix. valve control Enter the *Control range (°C)*, (section 5.2.1, *Mixing valve control*).

OUT.3 Control time heating
(Range = 0 ... 999 sec.)
(Factory setting = 30 sec.)

On/Off control	Enter the *Control time (seconds)*, (section 5.2.1, *Heating on/off*).
Mix. valve control	Enter the *Control time (seconds)*, (section 5.2.1, *Mixing valve control*).

OUT.4 Hysteresis/Control range thermal control
(Range = 0.0 ... 99.9°C)
(Factory setting = 0.3°C)

On/Off control	Enter the *Hysteresis (°C)* (section 5.3).
Mix. valve control	Enter the *Control range (°C)* (section 5.3).

OUT.5 Control time thermal control
(Range = 0 ... 999 sec.)
(Factory setting = 30 sec.)

On/Off control	Enter the *Control time (seconds)* (section 5.3).
Mix. valve control	Enter the *Control time (seconds)* (section 5.3).

OUT.6 Type of analog output 1
(Range = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)
(Factory setting = 1)

Enter the purpose for which analog output 1 will be used. A 0-10V and 10-0V output option is available with a number of possibilities. The option advised by Fancom is listed first.

Setting	Type of analog output 1
0	None
1	Air inlet / Vortex damper 10-0V
2	Air inlet / Vortex damper 0-10V
3	Heating 0-10V
4	Heating 10-0V
5	Thermal control 0-10V
6	Thermal control 10-0V
7	Vortex damper EXAVENT 10-0V
8	Ventilation 10-0V
9	Ventilation 0-10V
10	Ventilation with RPM feedback 10-0V
11	Ventilation with RPM feedback 0-10V
12	EXAVENT End station 10-0V

☞ If the FCTA has to control the Fancom EXAVENT system, assign type 7 here and set OUT.14 to 2.

OUT.7 Correction factor analog output 1
(Range = 0.0 ... 10.0)
(Factory setting = 0.1)

Enter the *Correction factor* (see section 5.2.2 and 5.3.1).

OUT.8 Control time analog output 1
(Range = 0 ... 999 sec./)
(Factory setting = 10 sec.)

Enter the *Control time (seconds)* (see section 5.2.2 and 5.3.1).

OUT.9 Correction buffer analog output 1
(Range = 0 ... 100)
(Factory setting = 5)

Enter *Correction buffer* (see section 5.2.2 and 5.3.1).

OUT.10 Type Analog Output 2
(Range = 0, 1, 2, 3, 4, 5, 6)
(Factory setting = 5)

Enter the purpose for which analog output 2 will be used. A 0-10V and 10-0V output option is available with a number of possibilities. The option advised by Fancom is listed first.

Setting	Type of analog output 2
0	None
1	Air inlet / Vortex damper 10-0V
2	Air inlet / Vortex damper 0-10V
3	Heating 0-10V
4	Heating 10-0V
5	Thermal control 0-10V
6	Thermal control 10-0V

☞ A similar setting cannot be made at OUT.6 and OUT.10. Air inlet control, heating control and thermal control can only be assigned at analog output 1 or analog output 2.

OUT.11 Correction factor analog output 2
(Range = 0.0 ... 10.0)
(Factory setting = 1.0)

Enter the *Correction factor* (see section 5.2.2 and 5.3.1).

OUT.12 Control time analog output 2
(Range = 0 ... 999 sec.)
(Factory setting = 600 sec.)

Enter the *Control time (seconds)* (see section 5.2.2 and 5.3.1).

OUT.13 Correction buffer/Minimum position analog output 2
(Range = 0 ... 100)
(Factory setting = 0)

Enter the *Correction buffer* or *Minimum position* (see section 5.2.2 and 5.3.1).

OUT.14 Type of Triac control
(Range = 0, 1, 2, 3)
(Factory setting = 1)

Enter the purpose for which the Triac control will be used.

Setting	Type Triac control
0	None
1	Ventilation without RPM feedback
2	Ventilation with RPM feedback

OUT.15 Capacity main fan
(Range = 0 ... 100%)
(Factory setting = 0%)

☞ This only applies if a second controlled fan (group) is to be switched, whereby control of the main fan will be reduced.

Enter the capacity of the main fan in relation to the total controllable fan capacity. If no second fan (group) is used set OUT.15 to 0.

If the FCTA controls an air inlet and there is second fan switching, OUT.16 should be set to a value greater than 0%. If there are no extra ventilation groups, set OUT.16 to 100%. The air inlet position will be calculated over the total controllable capacity.

If an analog output is used for vortex damper control, OUT.16 should be left on 0%. The FCTA will control the analog output together with the main fan.

OUT.16 Capacity controllable ventilation
(Range = 0 ... 100%)
(Factory setting = 0%)

☞ This only applies if the thermal control is used to activate one or two extra fan groups and when one of the analog outputs is used for air inlet control.

Enter the capacity of the main fan in relation to the total installed ventilation capacity, see chapter 5. If no extra fan (group) is to be activated, enter the value 0.

APPENDIX 1: System alarms

The computer executes a few test actions and a number of functions which concern the functioning of the computer. If an error is detected, the alarm code (type E) will appear on the display preceded by the letter E.

Table 3: Overview system alarms

Code	Cause	Action
E0	*Backup alarm* If a backup alarm is given, something has gone wrong with the computer's memory. Settings and measurements have been erased and the computer is controlling on the basis of the factory settings. No communication is possible during this alarm	Switch the alarm off and re-enter the computer numbers and settings manually. If a Personal Computer is used in the system, the user and the installer settings can be protected, not the calibration values.
E1	*Watchdog alarm* Program interruption.	Turn the computer off and back on and check that it is operating correctly.
E2	*Communication-alarm* There has been no communication possible for a length of time.	Check wiring and communication settings.
E3	*Setting changed* During the automatic memory test, an error was found.	Switch the alarm off and check all user and installer settings.
E4	*Stack overflow* Program interruption.	Turn the computer off and back on and check that it is operating correctly.
E5	*Communication assignment* There is another computer in the loop which has been set as Master.	Check to see that there is only one Master in the loop. Set all the other computers to Slave.
E6	*EPROM failure* During start-up or after a reset, a defect was found in the EPROM.	Turn the computer off and back on .Wait and see if the same alarm occurs again.
E7	*RAM failure* During start-up or after a reset, a defect was found in the computer's memory.	Turn the computer off and back on and wait and see if the same alarm occurs again.

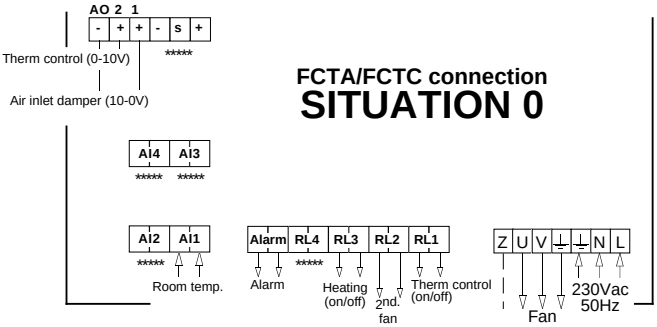
APPENDIX 2: Installation report

User	**Installer**
Name:	Name:
Address:	Address:
Place:	Place:
✎	✎
Installation	**Data**
Date:	Computer model: *FCTA*
	Program version:

SYS settings		**Situation Nr.**									
		B*	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Own**
SYS.1	System pre-settings	0	0	1	2	3	4	5	6	**7**	
SYS.2	Alarm therm. ctrl	NO	-	-	-	-	-	-	-	-	
SYS.3	Out. temp. influence	0	0	0	0	0	0	0	0	5	
SYS.4	Dec. time O.temp. infl.	10	10	10	10	10	10	10	10	48	
SYS.5	O.temp. infl. factor	2.0	-	-	-	-	-	-	-	-	
SYS.6	Heat demand heat.	0	-	-	-	-	-	-	-	-	
SYS.7	Heat demand th. ctrl.	0	-	-	-	-	-	-	-	-	
SYS.8	Centr. vent. ctrl. infl.	0	-	-	-	-	-	-	-	-	
SYS.9	Inlet pos. 100% ventil.	100	-	-	-	-	-	-	-	-	
SYS.10	Inlet pos. 80% ventil.	80	-	-	-	-	-	-	-	-	
SYS.11	Inlet pos. 60% ventil.	60	-	-	-	-	-	-	-	-	
SYS.12	Inlet pos. 40% ventil.	40	-	-	-	-	-	-	-	-	
SYS.13	Inlet pos. 30% ventil.	30	-	-	-	-	-	-	-	-	
SYS.14	Inlet pos. 20% ventil.	20	-	-	-	-	-	-	-	-	
SYS.15	Inlet pos. 10% ventil.	10	-	-	-	-	-	-	-	-	
SYS.16	Inlet pos. 1% ventil.	1	-	-	-	-	-	-	-	-	

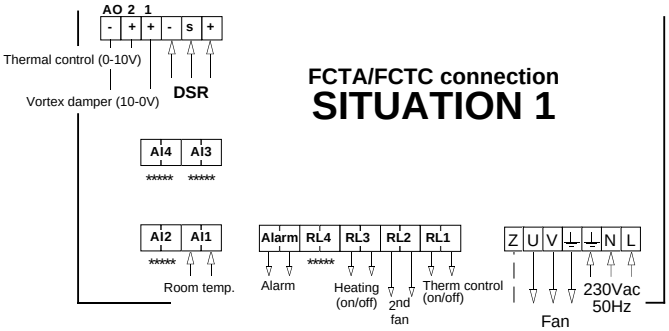
INS settings		Situation Nr.									
		B*	0	1	2	3	4	5	6	7	Own
INS.1	Corr. room sensor	0.0	-	-	-	-	-	-	-	-	
INS.2	Corr. extra sensor	0.0	-	-	-	-	-	-	-	-	
INS.3	Corr. th. ctrl. sensor	0.0	-	-	-	-	-	-	-	-	
INS.4	Corr. outside sensor	0.0	-	-	-	-	-	-	-	-	
INS.5	Outside sensor	NO	-	-	-	-	-	-	-	-	
INS.6	Extra sensors	0	0	0	0	0	0	0	0	0	
INS.7	Calibr. value DSR fb.	110	-	-	-	-	-	-	-	-	
INS.8	Calibration value 1%	60	-	-	-	-	-	-	-	-	
	Calibration value	125	-	-	-	-	-	-	-	-	
INS.10	Mains frequency	50	50	50	50	50	50	50	60	50	
INS.11	Unit of temperature	°C	°C	°C	°C	°C	°C	°C	°F	°C	
INS.12	Computer nr.	1	-	-	-	-	-	-	-	-	
INS.13	Baud rate	24-	-	-	-	-	-	-	-	-	
INS.14	Master/Slave	1	-	-	-	-	-	-	-	-	

OUT settings		Situation Nr.									
		B*	0	1	2	3	4	5	6	7	Own
OUT.1	Relay assignment	0	0	0	0	2	1	0	6	0	
OUT.2	Hyst/C.range heat.	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.0	0.3	
OUT.3	Control time heat.	30	30	30	30	30	30	30	60	30	
OUT.4	Hyst/C.range th.ctr	0.3	0.3	0.3	0.3	10.0	0.3	0.3	1.0	0.3	
OUT.5	Contr. time Th. ctrl.	30	30	30	30	60	30	30	60	30	
OUT.6	Type An.Out. 1	1	1	1	7	1	1	1	1	7	
OUT.7	Corr. factor AnOut 1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
OUT.8	Contr. time AnOut 1	10	10	10	2	10	10	10	10	2	
OUT.9	Corr. buffer AnOut1	5	5	5	0	5	5	5	5	0	
OUT.10	Type AnOut 2	5	5	5	5	5	5	5	3	3	
OUT.11	Corr. fact. AnOut 2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	5.0	
OUT.12	Contr.time AnOut 2	600	600	600	600	600	600	600	600	9	
OUT.13	Buffer/Min. AnOut 2	0	0	0	0	0	0	0	0	0	
OUT.14	Type Triac	1	1	2	2	2	2	1	1	2	
OUT.15	Cap. main vent.	0	0	0	0	0	0	0	50	0	
OUT.16	Cap. contr. vent.	0	0	0	0	0	0	0	0	0	



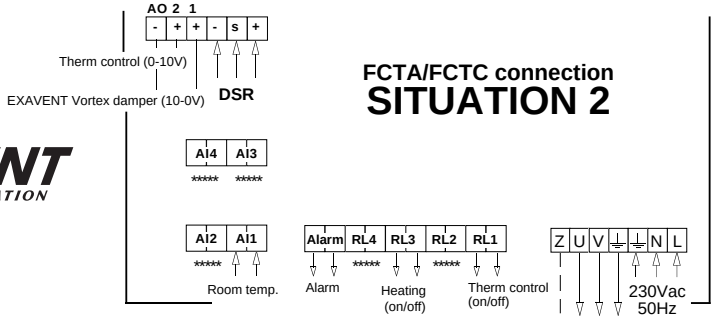
FCTA/FCTC connection

SITUATION 0



FCTA/FCTC connection

SITUATION 1

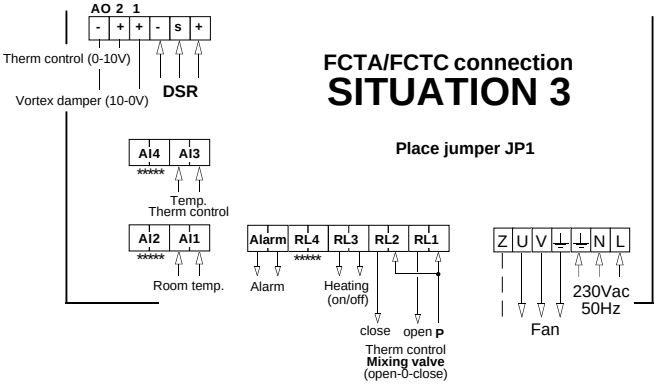


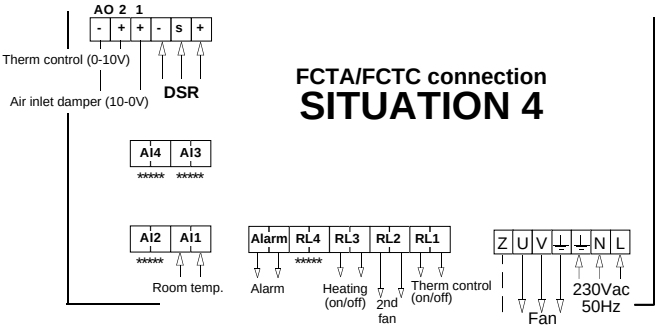
FCTA/FCTC connection

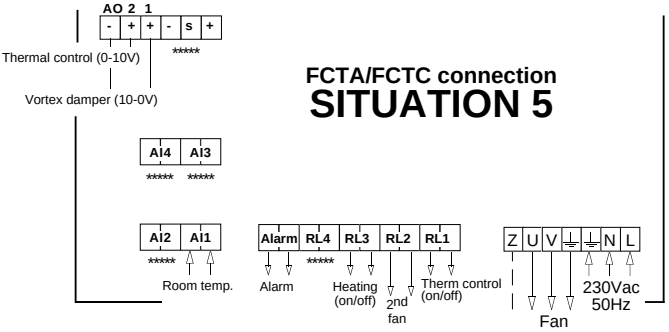
SITUATION 2

EXAVENT
EXACT VENTILATION

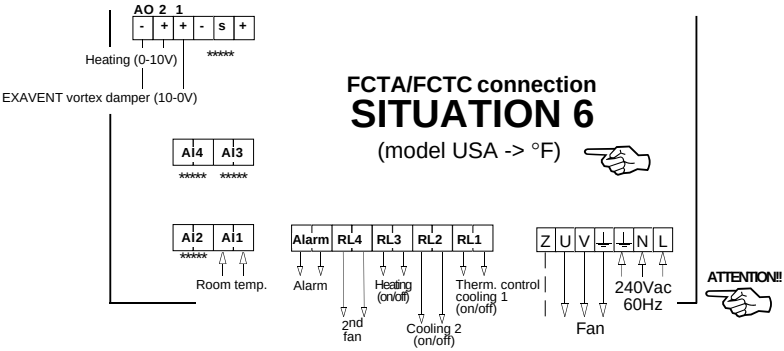
***** = not applicable

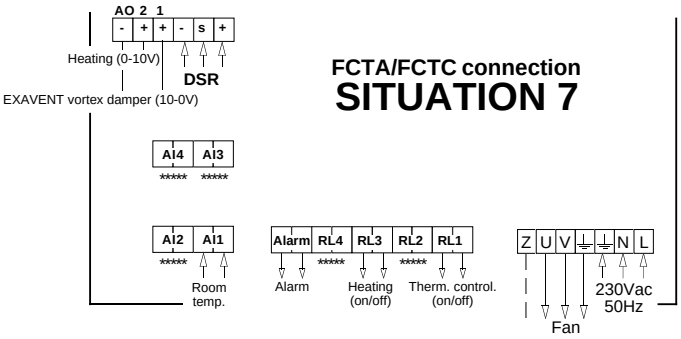


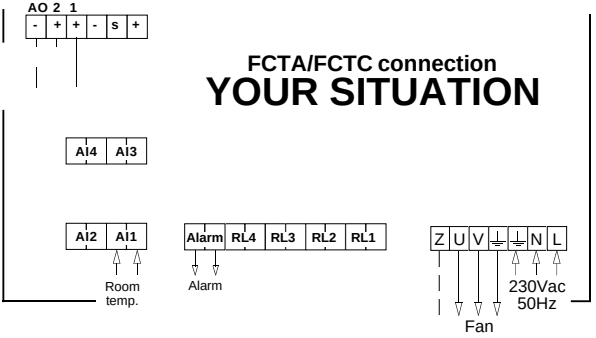




***** = not applicable

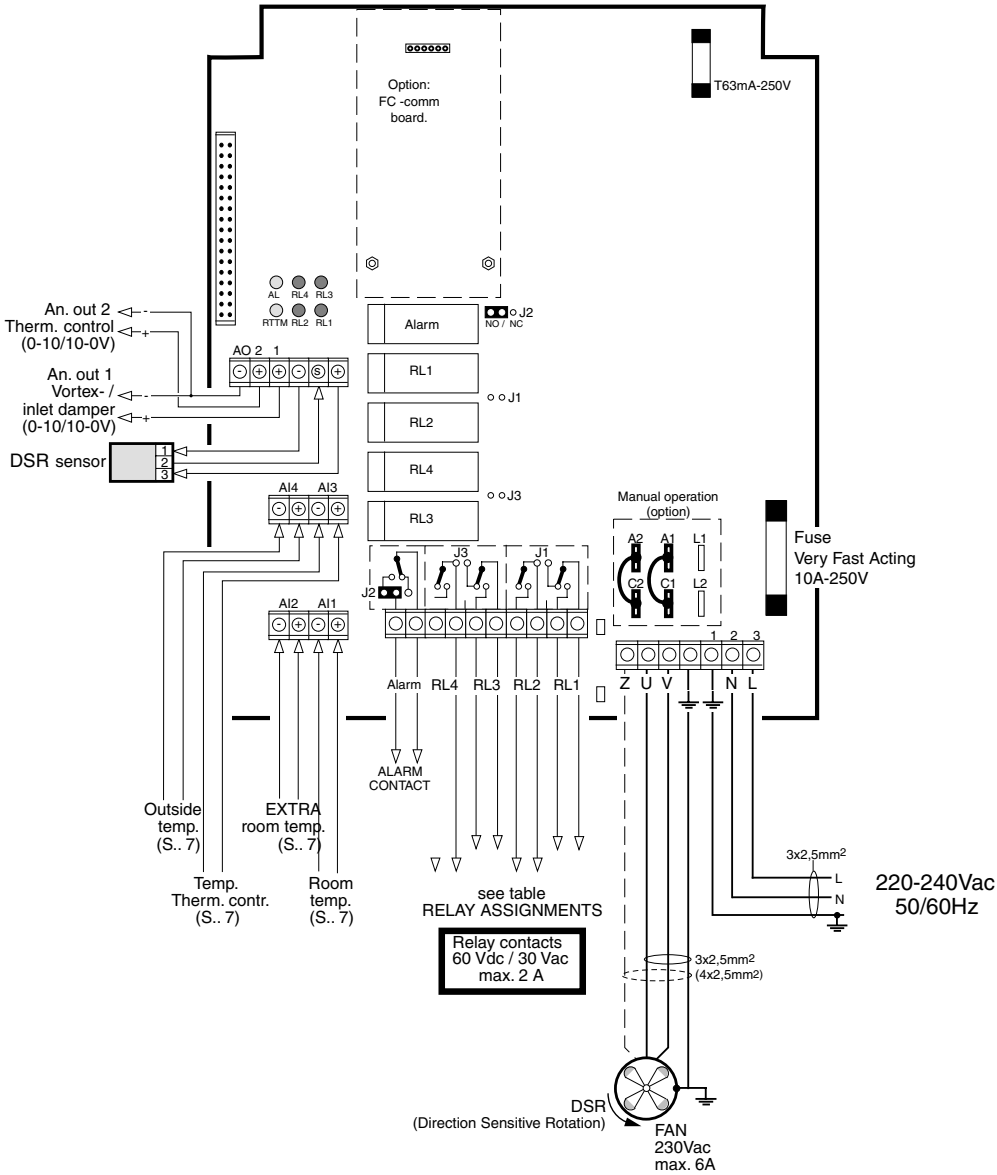






***** = not applicable

CONNECTION DIAGRAM FCTA / FCTC / FCT / FCNF

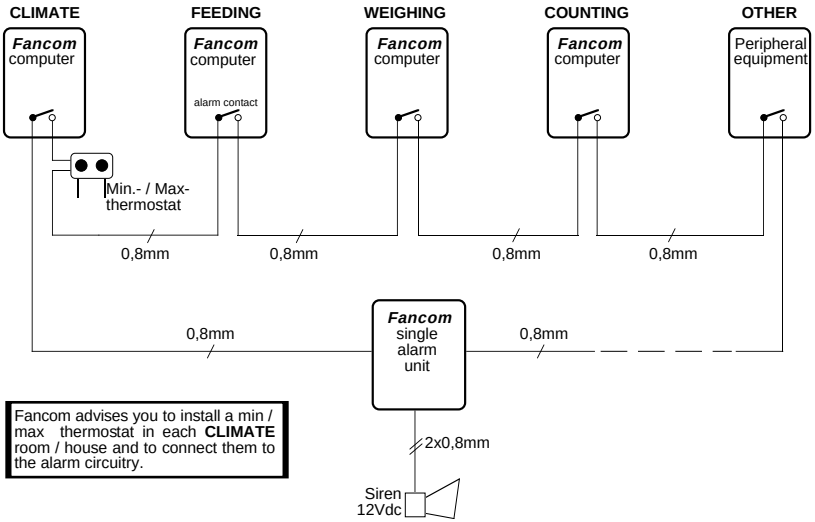


IMPORTANT!!!
All the equipment has
to be grounded correctly

Connect Fancom equipment according to the prevailing standards of the local electrical company.

ALARM DIAGRAM WITH A SIMPLE ALARM UNIT

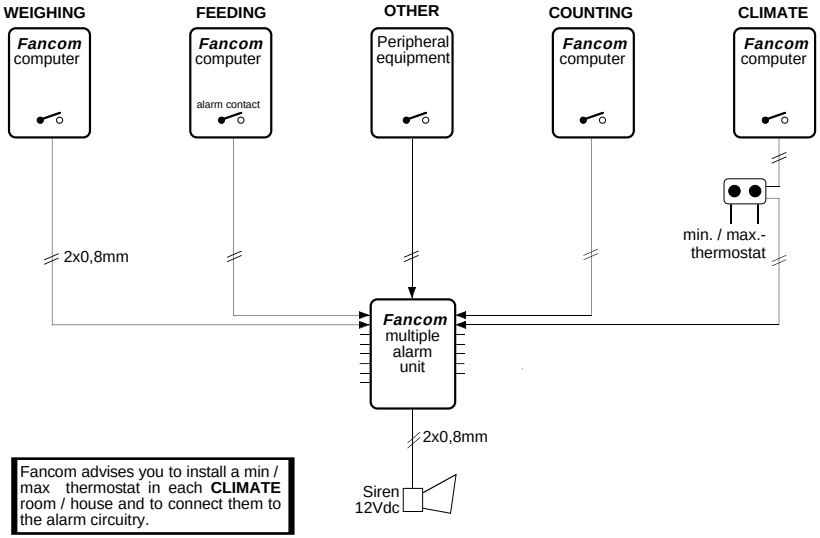
(all alarm contacts and min / max thermostats in series)



Fancom advises you to install a min / max thermostat in each **CLIMATE** room / house and to connect them to the alarm circuitry.

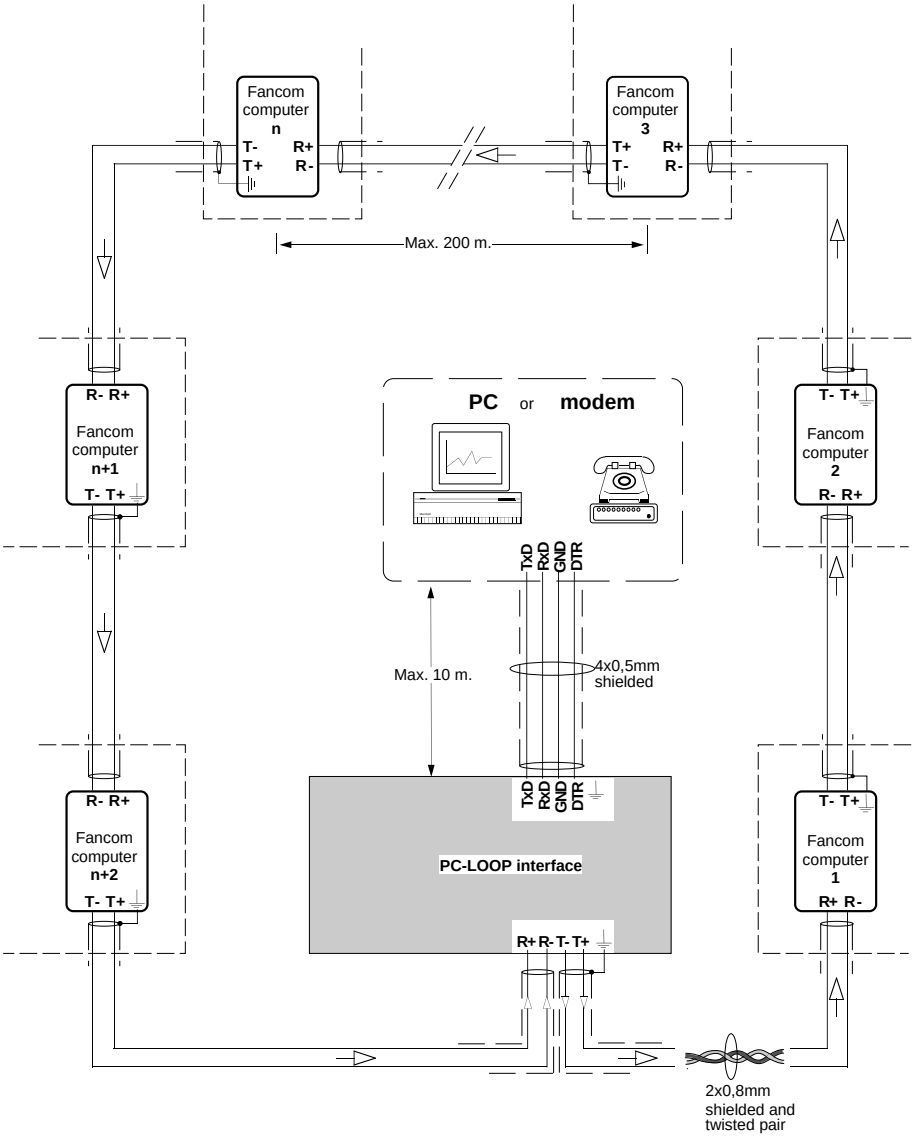
ALARM DIAGRAM WITH A MULTIPLE ALARM UNIT

(alarm per section)



Fancom advises you to install a min / max thermostat in each **CLIMATE** room / house and to connect them to the alarm circuitry.

GENERAL DIAGRAM LOOP COMMUNICATION



ATTENTION!!!
Ground the shield of the communication cable only on the transmit side (T+, T+).

Connect Fancom equipment according to the prevailing standards of the local electricity company.